FIELD INVESTIGATIONS OF UNCONTROLLED HAZARDOUS WASTE SITES

FIT PROJECT

TASK REPORT TO THE ENVIRONMENTAL PROTECTION AGENCY CONTRACT NO. 68-01-6056

PRELIMINARY SITE ASSESSMENT
HOLDEN LANDFILL SITE
Wachusett River Street
Holden, Massachusetts

December 8, 1981

TDD No. F1-8109-04

Prepared by: Ecology and Environment, Inc.
Field Investigation Team (FIT)
Region 1

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International Specialists in the Environmental Sciences

PRELIMINARY SITE ASSESSMENT
for
Holden Landfill Site
Wachusett River Street
Holden, Massachusetts

TDD #:	F1-8109-04
Site Name:	Holden Landfill Site
Address:	Wachusett River Street Holden, Massachusetts
Telephone:	(617) 829-6561
Owner:	Town of Holden
Principal Contact at Site:	Mr. Alan Berg, Holden Town Engineer

Contributors

Ecology and Environment, Inc.
Region 1 Field Investigation team

TDD # F1-8109-04

PRELIMINARY SITE ASSESSMENT
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The following Region 1 Field Investigation Team members made major contributions to this study in the capacities noted:

Project Manager	-	Christopher Hagger
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SECTION 1 - INTRODUCTION

1.1 PURPOSE OF INSPECTION

Officials of the Massachusetts Department of Environmental Quality Engineering (DEQE) together with representatives of the Region I EPA Office of Uncontrolled Waste Sites have selected the Holden Site for further evaluation. This evaluation is in preparation for future studies and/or actions that may be implemented under the auspices of the EPA with funds provided by the Hazardous Waste Containment Act of 1980. Ecology and Environment's (E & E) Region I Field Investigation Team was tasked by EPA to perform a Preliminary Assessment of the Holden Landfill under Technical Direction Document (TDD) No. F1-8109-04. A preliminary assessment represents the first phase of an investigation which may lead to site-specific recommendations.

The purpose of this assessment is to organize and evaluate existing information on the Holden Landfill, most of which is contained in Region I EPA files; to make an evaluation of the immediate or long term human and environmental effects of the Landfill, to recommend emergency measures if necessary; and to recommend further action to study and characterize the site.

1.2 OBJECTIVE

The objectives of this assessment were to obtain information about the Holden Site, to discuss any associated hazards, and to present conclusions and recommendations. The E & E report is presented as follows: Site Background includes a general description of the site; a discussion of activities at the site and a site history. Hazards Alleged and/or Identified describes suspected types, amounts and sources of wastes at the site and discusses people or environments at risk in the area and the pathways by which contamination could reach them. The final section of the report discusses Conclusions and Recommendations. A completed EPA Form 2070-2 (10-79) "Potential Hazardous Waste Site Identification and Preliminary Assessment" is also included in Appendix A.

SECTION 2 - SITE BACKGROUND

2.1 SITE DESCRIPTION

The Holden Site is situated in the Town of Holden, Massachusetts in a sparsely populated and wooded area off Wachusett River Street. It can be located on the United State Geological Survey (USGS) 15 Minute Sterling Massachusetts Quadrangle at the approximate coordinates of 42° 22' 40" North and 71° 49' 20" West (Figure 1). The Holden Town Dump (HTD) occupies part of the site.

The Holden Site covers approximately 60 acres and is bounded on the north by the Quinapoxet River, on the west by a wooded area, on the south by Wachusett River Street and on the east by the construction of Interstate I-190. The site consists of the HTD, a small pond and several groundwater leachate seeps/streams. The HTD can be reached via an access road from Wachusett River Street located 2000 feet east of the intersection of Harris Street and Wachusett River Street. Both the pond and HTD are located in the southern section of the site at an elevation of approximately 590 feet above mean sea level (MSL). The pond and HTD are situated approximately 1500 feet away from the Quinapoxet River which is at an elevation of approximately 460 feet above MSL. Surface water flow from the HTD/Pond area would flow either to the north towards the Quinapoxet River or to the south across the Wachusett River Road to an unnamed brook which is tributary to the Quinapoxet River. Two ridges at approximate elevations of 600 feet above MSL are located along the east and west boundaries of the site. A low lying swampy area exists east of the eastern boundary ridge of the site. The leachate seeps are located in the northern section of the site along the steep embankment (28 percent slope) leading down to the Quinapoxet River.

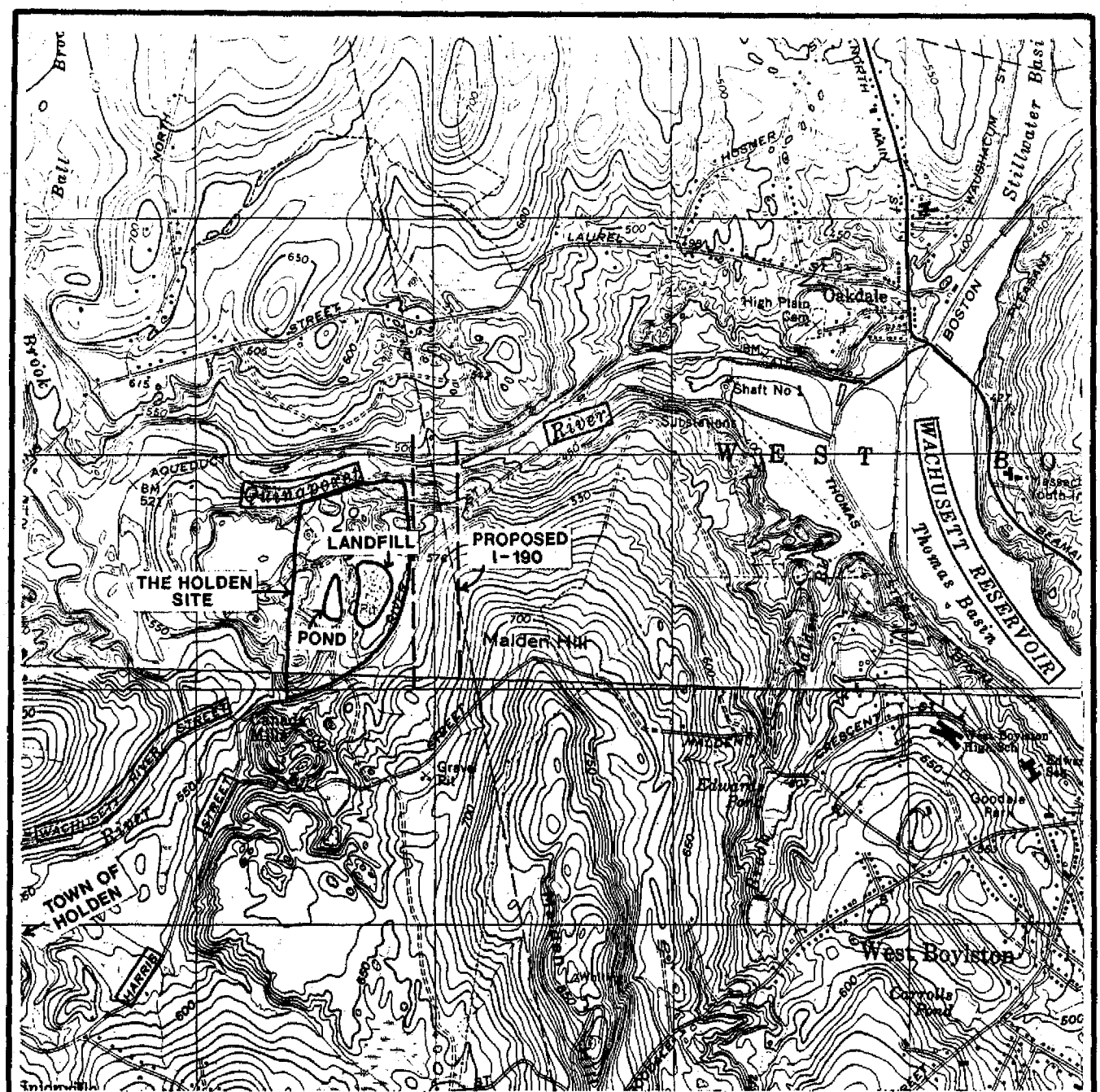

FIGURE 1: HOLDEN SITE LOCATION
From U.S.G.S. Sterling Quadrangle, 15 min. Series
Scale 1:25000

2.1 Site Description - continued

There is no town water or sewer in this area; however, there is one well at the entrance to the site which is used for water at the landfill. There are six groundwater monitoring wells on site located to the north of the HTD/Pond. Figure 2 shows an overall sketch of the site, topographical contours, and other characteristics. The Quinapoxet River is the main tributary to the Wachusett Reservoir which is located less than 1.5 miles downstream from the site along the Quinapoxet River. The Wachusett Reservoir is part of the Metropolitan District Commission System which supplies drinking water to approximately 2,000,000 people in the metropolitan Boston area.

2.2 SITE ACTIVITY

The site of the fifteen-acre HTD was formerly a sand and gravel operation. The HTD has been in operation since 1959 and was approximately two-thirds full by 1980. The Town of Holden Engineering Division is presently preparing plans for diversion of surface flow around the completed and working faces of the landfill.(1)

2.3 SITE HISTORY

The history of the site as presented here is based on review of EPA correspondence, memoranda, analytical results and other information contained in the EPA files.

The following chronology has been assembled from available information:

1980

02-20-EPA environmental monitor on Interstate I-190 in Holden observed leachate entering Quinapoxet River and informed EPA Enforcement Division to determine if there is a violation of the Clean Water Act.

03/14-EPA received water samples collected from Quinapoxet River and Muddy Brook.

04/09-EPA performed purgeable organic analyses on samples and detected levels greater than 600 ppb of 1.1.1-trichloroethane in the Quinapoxet River sample.

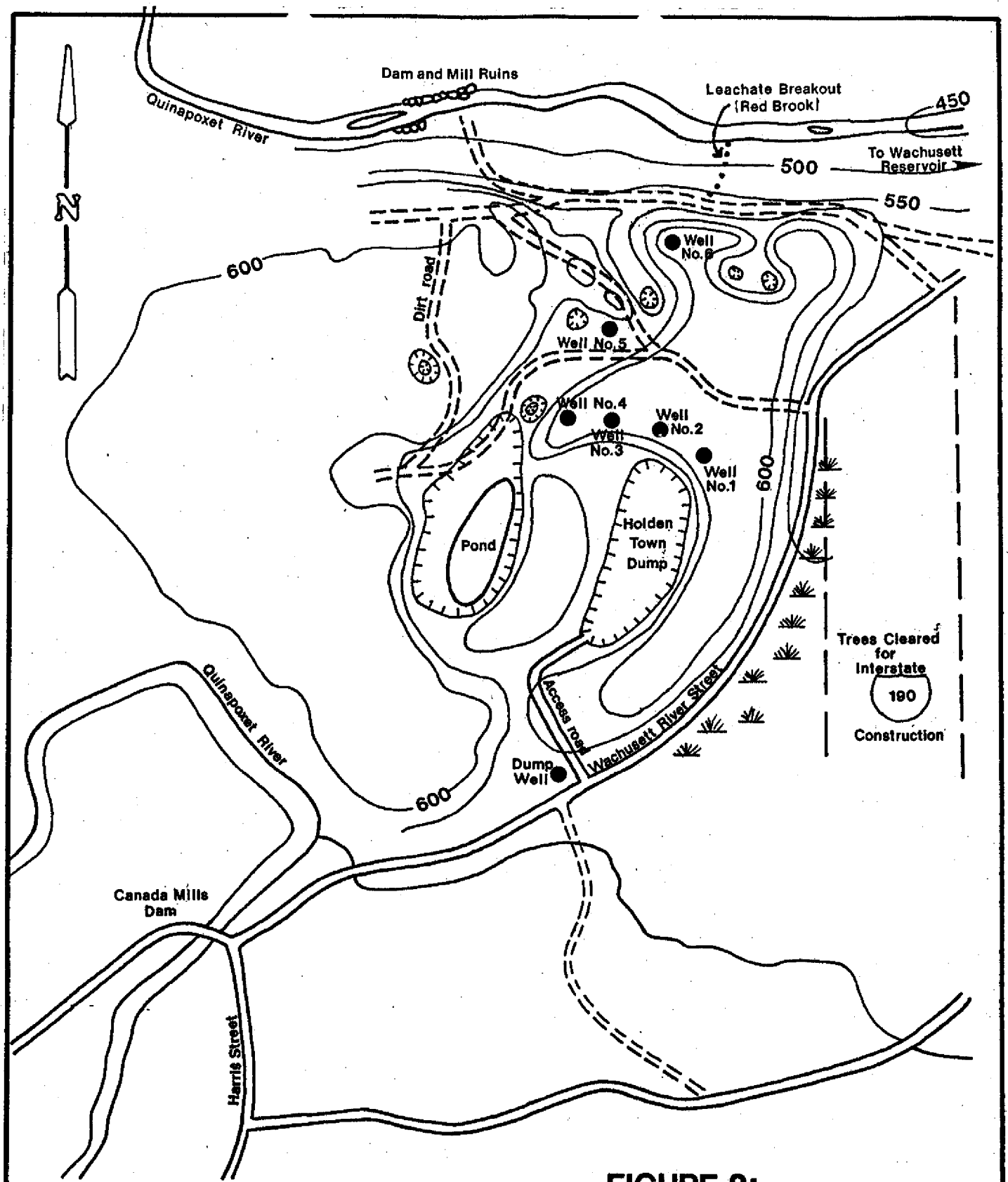

FIGURE 2:
HOLDEN SITE SKETCH
Not to scale

2.3 Site History - continued

1980

05/02-EPA site investigation of the Holden Site in response to state of Massachusetts request regarding applicability of Federal funds to clean up observed leachate streams. EPA took several surface water samples at the Holden Town Dump (HTD) site.

05/07-EPA purgeable organic analysis of HTD surface water samples showed presence of 1,1,1-trichloroethane, toluene, ethylbenzene, benzene and 1,1-dichloroethane.

05/08-EPA was quoted in the Worcester, Massachusetts Evening Gazette as stating that the Quinapoxet River is free of significant chemical pollution and that it has not been determined whether the chemicals are leaching from the HTD.

05/20-EPA extractable organic analysis of HTD surface water samples showed presence of cresol isomers, di-n-ethylphthalate and several unidentified organic acids.

11/01-11/30-Six groundwater monitoring wells installed by State of Massachusetts to confirm or rule out Town of Holden landfill as the source of leachate.

-EPA constructed two leachate control structures

12/18-DEQE requested EPA assistance in sampling and analysis of six groundwater monitoring wells.

1981

01/28-EPA sampling and analyses of the six groundwater monitoring wells at the HTD showed the presence of 1,1-dichloroethane, 1,1,1-trichloroethane, benzene, toluene, ethylbenzene and others.

02/01-Emergency Action Plan for Holden Town Dump (HTD) submitted by EPA/OHM. The Plan stated that because of the limited number of observation wells, it has not been proven beyond a reasonable doubt that the landfll is the source of the contaminated leachate. The Plan recommended hiring of a hydrogeological consultant to determine the groundwater flow pattern in the area, to define extent of contamination and to verify HTD as the source. It also recommended periodic monitoring of groundwater wells and leachate.

03/24-EPA requested that the Massachusetts Department of Public Works (DPW) have a consultant review the effects that the proposed Interstate I-190 Quinapoxet River crossing might have on the leachate problem from the nearby HTD.

04/06-EPA site visit to the HTD.

2.3 Site History - continued

1981

04/16-EPA concluded that the measured depth to water in the existing State wells, their geographic position and site topography all support the conclusion that groundwater and leachate flow from the HTD toward the Quinapoxet River. EPA recommended that existing groundwater monitoring wells be surveyed and the depths to water measured. EPA also recommends weekly sampling and analysis of the groundwater monitoring wells and selected surface water locations for a duration of one month.

04/23-DPW responded to EPA with a consultant's evaluation of the HTD leachate problem and the proximity of the Interstate I-190 crossing construction. The consultant stated that the bridge crossing construction should not interfere with the path of the leachate flow and if any leachate was found in the groundwater during bridge foundation construction, it would be pumped to the construction impoundment area for disposal through sand filters.

05/01-DEQE notified the Town of Holden that it is in violation of Regulations for the Disposal of Solid Waste by Sanitary Landfill and the Drinking Water Regulations as a result of leachate contamination generated by the HTD.

05/12-EPA proposed two rounds (Rounds I and II) of surface and groundwater sampling and priority pollutant analysis at 18 sampling stations (groundwater, surface water and leachate seeps) to determine the presence, concentration and identity of material leaching from the HTD. EPA stated that additional groundwater monitoring wells would be required to determine the areal and vertical extent of any leachate plume.

06/09-DEQE informed DPW that it is still concerned that Interstate I-190 construction activities could alter the flow of leachate from the HTD and adversely affect the Quinapoxet River and therefore requested a meeting with the DPW for further discussions.

06/17-EPA Surveillance and Analysis Branch collected Round I samples from the HTD site and measured the depths to groundwater.

07/23-Round I analytical results showed presence of 1,1-dichloroethane, trans-1,2-dichloroethylene, vinyl chloride, benzene, toluene, ethylbenzene, dioxane, xylenes, and methyl isobutyl ketone at some of the sampling locations.

08/04-Holden responded to the DEQE that it will take action to study the possibility that the HTD is a source of low level leachate contamination. This action will include a topographic survey of the HTD, periodic groundwater sampling and the preparation of a drainage and sealing plan for the HTD.

2.3 Site History - continued

1981

08/14-EPA proposed the installation of additional monitoring wells at the HTD site. These wells include one upgradient well, two downgradient wells located to the north of the HTD to replace four existing steel-cased state wells which are inadequately top sealed and improperly developed, and five additional downgradient wells to define the lateral extent of the contaminant plume and to assess attenuation and retardation of the contaminants.

08/18-EPA informed the DEQE Commissioner that there is no disagreement regarding HTD being the source of contamination discovered in leachate breakouts near the Quinapoxet River.

11/03-EPA performed additional sampling and analysis at the HTD (Monitoring Wells #2 and 5, leachate breakouts). This sampling confirmed presence of contaminants found in Round I sampling and also included the presence of 1,1,1-trichloroethane. The Wachusett Reservoir and Quinapoxet River were also sampled. The Wachusett Reservoir sample showed less than 0.5 ppb toluene.

11/23-Ecology and Environment, Inc. performed a perimeter site survey of the HTD.

2.4 SITE GEOLOGY/HYDROGEOLOGY

The geology and hydrogeology of the site as presented below are based upon a review of EPA correspondence, a Final Environmental Impact Report for Interstate I-190 (2), a Water Resources Study of the Nashua and Souhegan River Basins (3), on-site groundwater monitoring well logs and information provided to FIT by the Department of Public Works in a Proposed Compliance Plan for the Holden Sanitary Landfill (5).

The site is located in a depression between two north-south trending hills. It is bounded on the east and west by the two hills, on the north by the Quinapoxet River and on the south by a gentle slope that leads to Wachusett River Street.

The site is generally underlain by dense granular soil lying on bedrock. The thickness of the overburden ranges from 40 to 90 feet (2).

2.4 Site Geology/Hydrogeology - continued

The surficial deposits on the site are composed of stratified and sorted (glaciofluvial) deposits of sand, gravel, silt and clay (3), overlying a discontinuous layer of till (2, 4). The glaciofluvial deposits are characteristically a loose, brown to tan well-graded material. The till is a dense gray silt and gravelly sand with boulders (2).

The bedrock is composed of metamorphic units. The predominant formations are composed of mica schist, chloride schist and phyllite, interbedded with micaeous quartzite. The mica content in these formations gives the bedrock a significantly fissile nature, that is, the bedrock is fractured along parallel planes of weakness. Irregular fractures and small faults are also present in the bedrock (2). Predominant strike and dip directions of these features are unknown. Subsurface bedrock topography is also unknown, because of a lack of geophysical data for the site.

Detailed hydrogeologic data for the site is not available. However, a review of the previously mentioned references allows the following hydrologeologic conclusions to be drawn.

1. Static water level measurements taken on 17 June 1981 by EPA in monitoring wells 1 through 6 indicate a hydraulic gradient sloping northeast from the disposal site toward the Quinapoxet River. Groundwater originating on the site is likely to be recharging the River in this area.

2. Surface topography suggests that there may be subsurface hydraulic connections between the site and the intermittent stream to the south, the pond to the west and a swamp area adjacent to Route I-190. However, lack of hydrologic data in these areas prevents verification of groundwater movement in these directions.

3. Static water level measurements taken in 1972 and 1974 by the Engineering Department of the Town of Holden (5) revealed that water levels were higher in the pond west of the site than in test borings and pits on the landfill. These data suggest that the pond may be "perched" above the regional water table and may not be hydrologically connected with groundwater movement under the site.

2.4 Site Geology/Hydrogeology - continued

4. Well yields for the unconsolidated and bedrock aquifers are as follows: (3)

--	Glaciofluvial Deposits	0-100 gal/min.
--	Till	0-10 gal/min.
--	Bedrock	0-10 gal/min.

EPA has proposed the installation of eight additional groundwater monitoring wells at the Holden Site. One of these wells would serve as an upgradient well, to be located south of the HTD replacing the HTD well for sampling purposes. Two wells are proposed to replace the State - installed wells located north of the HTD. Five additional groundwater monitoring wells are proposed by EPA to locate the vertical extent of a contaminant plume as it may travel towards the Quinapoxet River. EPA has also proposed that an electrical resistivity subsurface investigation be performed in the area between the HTD and the Quinapoxet River. This study, to be performed in advance of the groundwater monitoring well program, also seeks information on the lateral contaminant plume movement as well as any information on stratigraphy and bedrock features.

SECTION 3 - HAZARDS ALLEGED AND/OR IDENTIFIED

3.1 WASTE CHARACTERISTICS

3.1.1 TYPES AND QUANTITIES

No data exist which characterize the wastes which have been discarded at the HTD. The HTD was developed to receive mixed municipal refuse, however, some industrial waste may have been disposed of in the landfill (6).

The majority of industrial waste brought to the HTD comes from three sources within the Town of Holden (6). These sources are 1) Electronics Controls Corporation which manufactures printed circuit boards, 2) Reed Rolled Thread & Die Company, a tool and machine die manufacturer, and 3) Reid Plastics Corporation which manufactures plastic products. At one time industrial sludge was hauled from Presmet-GKN Power Met., Inc., a screw manufacturing facility, and disposed at the landfill site. This material is no longer brought to the HTD. It has also been reported that Reed Rolled Thread & Die Company may also have disposed a sludge material at the HTD (7). Other industrial wastes landfilled at the HTD consist mainly of paper products and small empty waste containers.

Some refuse was also deposited in the pond located immediately west of the HTD. Tires have been visible along the edge of the pond (7). Purgeable organic analysis of a water sample from the pond indicated no detectable contamination. The analytical results may be found in Appendix A. Several leachate breakouts have been observed at the ground surface north of the HTD on the steep slope which leads down to the Quinapoxet River. Some of these leachate breakouts form several small streams have been stained a yellow-orange color.

3.1 Waste Characteristics - continued

It has been estimated that flow from the major breakout named "Red Brook," can be up to 10 gallons/minute (7). This leachate at times has been described as foamy, whitish-colored with a pronounced odor (7). Other leachate streams which were observed on site flowing towards the Quinapoxet River exhibited flows of only 1-2 gallons/minute.

3.1.2 WASTE MANAGEMENT/DISPOSITION

Open dumping commenced in 1959 on property owned by the Town of Holden and known as HTD. In 1970, plans were developed by a consultant to the Town of Holden to operate and develop the HTD as a sanitary landfill using a cut and fill landfilling technique. The landfill is located in an area previously used for sand and gravel mining. Site security consists of a locked gate on the access road located immediately south of the HTD. The sides of the access road are also fenced. The landfill site contains a maintenance building/storage shed for landfill equipment. Water for sanitary facilities and vehicle washing is provided by an on-site well.

The HTD was cited on 1 May 1981 by the DEQE for violations of 1) the regulations for the disposal of solid waste by sanitary landfill and 2) drinking water regulations. On 4 August 1981, the Town of Holden proposed a voluntary compliance plan to serve in place of a formal compliance order which would have been issued by the DEQE. This plan consisted of a topographic survey of the HTD, and design of surface flow diversion for the completed face of the HTD. The topographic survey of the HTD is estimated to be completed by December 1981. Final impervious soil cover is being purchased for the completed portions of the HTD (approximately 30-40% of the total available landfill area) in order to prevent any surface water infiltration as outlined above.

3.1 Waste Management/Disposition - continued

It has been estimated that landfilling capacity at the HTD will run out by 1988 (6). The HTD receives mixed municipal refuse/ industrial waste between 10 a.m. and 4 p.m. five days per week. There are no weighing scales for truck delivery, however, the Town of Holden has performed two surveys in 1975 and 1979 to quantify the amount of landfill volume which is still available for waste disposal. In 1975, 240.20 acre-feet were available for landfilling whereas in 1979 only 62.75 acre-feet remained available (6).

3.2 PATHWAYS AND RECEPTORS

3.2.1 Air Contamination

Ambient air monitoring for organic vapors has not been conducted at the Holden site. However, EPA Investigators have detected pronounced odors in the vicinity of the leachate breakouts north of the HTD on site inspections in May 1980 and April 1981.

3.2.2 Surface and Groundwater Contamination

Surface water from the HTD may flow off-site in a southerly direction, eventually draining into the Quinapoxet River. Surface water from the HTD can also flow in a northerly direction off-site down a steep embankment and into the Quinapoxet River downstream from the previously described surface flow discharge location. The Quinapoxet River at this point is located approximately one and one-quarter mile from its discharge into the Wachusett Reservoir, which is a drinking water supply for the Boston metropolitan area. There are two surface water features on site which include a small pond located adjacent and to the west of the HTD and a series of groundwater leachate breakouts, north of the HTD, some of which form small leachate streams.

Surface water at various locations on and off site has been sampled and analyzed. Results of purgeable organic analysis on samples taken from the Quinapoxet River at the confluence with the HTD leachate stream (Red Brook) are presented in Table 1. Concentrations of contaminants was determined only for the priority pollutants listed in Table 1.

TABLE 1

Quinapoxet River Analysis

March 1980		May 1980	
Compound	Approx. Conc. (ppb)	Compound	Approx. Conc. (ppb)
Dichloro-fluoro-methane*		acetone*	
Acetone*		methyl ethyl ketone*	
Isopropyl Alcohol*		methyl isobutyl ketone*	
1,1-dichloroethane	100	Isopropyl alcohol*	
1,1-dichloroethylene	10	1,1,1-trichloroethane	1
trans-1,2-dichloroethylene	20		
methyl ethyl ketone*			
1,1,1-trichloroethane	L600		
trichloroethylene	1		
benzene	4		
methyl methacrylate*			
methyl isobutyl ketone*			
toluene	30		
ethylbenzene	3		
tetrachloroethylene	2		

* = non-priority pollutant, therefore not quantified

L = greater than

3.2 Pathways and Receptors - continued

In May 1980 additional surface water samples were taken for purgeable organic analysis from the Quinapoxet River upstream from the HTD site as well as from the on-site pond located immediately west of the HTD. No volatile organic compounds were detected in these samples. Additional surface water samples were collected in July 1981 for purgeable organic analysis. Results of this analysis are presented in Appendix B; however, no contaminants were detected in the surface water of the pond (reference No. L005) or the Quinapoxet River (reference Nos. 001, 002) both upstream and immediately downstream of the site. Furthermore, no contaminants were detected from limited surface water sampling in the Quinapoxet river conducted again in November 1981.

The groundwater leachate breakouts, located north of the HTD near the Quinapoxet River were also sampled and analyzed in July and November 1981. The main leachate stream was sampled at several locations upstream from the Quinapoxet River. Purgeable volatile organic analysis results showed in part the presence of the following compounds:

	Concentration Range (ppb)
1,1-dichloroethane	1.1 - 59
trans-1,2-dichloroethylene	9 - 16
1,1,1-trichloroethane	trace - 65
toluene	trace - 11
ethylbenzene	0 - 3
xylenes	0 - 8

These compounds, however, were not detected in the main leachate stream prior to entering the Quinapoxet River. (See Appendix B, reference Nos. L1A, L1B and L1C, for analytical results and Figure 2 for sampling locations)

Other leachate streams which enter the Quinapoxet River 200 to 500 feet upstream of the main leachate stream were sampled prior to entering the Quinapoxet River. The analysis of samples taken in July 1981 (Appendix B, Reference Nos. L02, L03, L04, L05) detected no volatile organic compounds except 220 ppb of dioxane

3.2 Pathways and Receptors - continued

in the leachate stream which enters the Quinapoxet River 500 feet upstream from the main leachate stream. Analysis of samples taken in November 1981 from the other leachate streams showed in part the presence of the following compounds:

	Concentration Ranges (ppb)
1.1-dichloroethane	19 - 210
1,1,1-trichloroethane	2.6 - 240
toluene	1.7 - 21
1,2-dichloroethylene	3.8 - 21
1,2-dichloroethane	1.2 - 21
vinyl chloride	17 - 190

A conclusion can be made from observation of the analytical results on the leachate breakouts and other surface waters that there is a tremendous variation of contaminant concentrations detected at various sampling times. The presence/absence of certain contaminants at different sampling times particularly in the leachate breakouts also confirms this variability.

Available analytical data indicate that the Wachusett Reservoir, which is fed by the Quinapoxet River, was sampled only in May 1980 and November 1981. No contaminants were detected in 1980, however, less than 0.5 ppb of toluene was detected in 1981.

Settling ponds are to be constructed at the Route I-190/ Quinapoxet River Bridge crossing construction site which is located to the east of the site. Groundwater removed during the bridge abutrment foundation construction will be pumped into these settling ponds.

Six groundwater monitoring wells were installed on site by the State of Massachusetts in November 1980. These wells, all located between the HTD and the Quinapoxet River, were not properly constructed or adequately secured (8). There is also a well on site used to supply water for the HTD equipment.

3.2 Pathways and Receptors - continued

Purgeable volatile organic analysis of the on-site well did not detect any volatile organic compounds. Table 2 presents a partial list of the volatile organics detected during sampling/analysis of the six groundwater monitoring wells. Locations of these wells are plotted on Figure 2.

Comparison of the analytical data presented in this section indicates that the same contaminants are present in the groundwater north of the HTD, the leachate breakouts north of the HTD and the Quinapoxet River.

3.2.3 Direct Contact

Limited sampling/analysis of the groundwater leachate breakouts/streams located north of the HTD indicates that the site does not presently constitute a direct contact health hazard. Vehicular access is limited at the HTD from the southern site access road; however, access by foot can be gained to the site along its boundaries. A full site inspection combined with further monitoring of surface water and leachate as well as the landfill closure techniques will determine more conclusively if there is any potential on site for direct exposure to any hazardous and toxic chemicals.

TABLE 2

Groundwater Monitoring Well Analyses (ppb)

Holden, Massachusetts

1 9 8 1

	#1*	#2			#3		#4		#5			#6	
	01/28	01/28	07/23	11/03	01/28	07/23	01/28	07/23	01/28	07/23	11/03	01/28	07/23
1,1-dichloroethane	159	ND	ND	ND	ND	1	5	3	12	ND	8.4	9	4
trans-1,2-dichloroethylene	34	42	25	17	40	6	15	16	16	ND	3.4	108	32
1,1,1-trichloroethane	298	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	15	1
benzene	12	12	9	2.3	10	9	8	3	20	1	16	7	6
toluene	114	85	67	61	102	62	4	2	120	60	98	17	12
ethylbenzene	18	17	8	16	13	13	12	1	35	30	25	2	-
vinyl chloride	ND	ND	100	190	ND	18	ND	34	ND	58	250	ND	21
xylenes	ND	ND	50	30	ND	26	ND	3	ND	110	50	ND	17
dioxane	ND	ND	ND	ND	ND	ND	ND	ND	ND	138	ND	ND	ND

* = Well #1 was dry on 7/23/81 therefore no sample collected.

SECTION 4 - CONCLUSIONS AND RECOMMENDATIONS

This preliminary assessment summarizes available information on the HTD site history and the results of sampling/analysis of both surface water and groundwater suspected of being contaminated by the HTD facility. This assessment raises two issues regarding the site which should be addressed. These issues are:

In the short term,

1. Does the site possess the potential for any immediate health effects from either possible contamination of the MDC Wachusett Reservoir, (via the Quinapoxet River), or I-190 Bridge Crossing construction activities where potentially contaminated groundwater must be pumped to manmade surface impoundments, or direct contact with leachate streams and other surface water on site?

In the long term,

2. What is the extent of groundwater/bedrock contamination on and off site, can the leachate flow(s) be fully characterized as to quantity/quality (remedial options), and what effects will future HTD operations have on surface water/groundwater contamination?

The following recommendations are presented in the order in which they should be executed. The purpose of these recommendations is to fill in the gaps in information currently available regarding the site and the three contaminant pathways - air, surface water and groundwater. It also seeks to gather analytical data on a more continuous basis to better characterize the contaminants and their concentrations.

1. Perform site inspection and use a portable organic vapor analyzer to characterize area of leachate breakouts (air pathway).

2. Site inspection should also include sampling/OVA analysis of Wachusett Reservoir, Quinapoxet River downstream, HTD Pond and off-site surface water to the east and south of the site (surface water pathway)

3. Review activities of construction personnel in regard to contact with and disposal of any contaminated groundwater resulting from bridge abutment construction procedures (groundwater pathway)

Section 4 - Conclusions and Recommendations - continued

4. Review existing HTD closure plans and operations with regard to minimizing/avoiding further site contamination (all pathways)

5. Monitor leachate breakouts, HTD Pond, Quinapoxet River and the Wachusett Reservoir on a continuous basis (i.e. monthly) to more accurately assess the surface water contamination which exists based on past random limited surface water sampling, the results of which were extremely variable.

6. Survey remaining areas of the site in addition to those areas currently being completed by the Town of Holden. The purpose of the survey is to produce a topographical base site map (1" = 100') with existing manmade features such as dirt roads, boundaries, power lines, surface water, existing wells, etc. This map will cover the area bounded by Wachusett River Street to the south and east, the Quinapoxet River to the north and along the west side of the HTD Pond. It will be used to develop further site investigatory work (i.e. subsurface geophysical, groundwater monitoring wells)

7. Perform a full field investigation which includes an electrical resistivity (ER) subsurface site investigation for all areas surrounding the HTD to assess potential horizontal contaminant plume migration from the HTD and to also determine groundwater/bedrock profiles. The profiles will be used to understand the complete hydrogeology of the site and how it effects the on-site pond and leachate breakouts.

8. Measure surface water and groundwater table elevations concurrently with ER study.

9. Perform a seismic refraction study on site as needed to verify and/or determine bedrock/groundwater contours.

10. Submit Interim Field Investigation report.

11. Develop and implement groundwater well monitoring program to assess full aquifer and bedrock contamination (vertical migration) and to allow continuous monitoring of horizontal plume migration.

12. Sampling/analysis of groundwater monitoring wells.

13. Quantify leachate flow into the Quinapoxet River.

14. Review future plans by the Town of Holden for the HTD.

15. Complete field investigation report.

Recommendations 1, 2, 3 and 4 are intended for short term study and investigation whereas items 5 through 15 will require considerably more time, planning and effort and seek to gather data necessary for any long term remedial options.

SECTION 5 - REFERENCES

1. Letter. Allan R. Berg, Town Engineer, Holden, Massachusetts to Gilbert T. Joly, DEQE, Worcester, Massachusetts dated 4 August 1981.

2. Final Environmental Impact Report for Interstate I-190, Massachusetts Department of Public Works. 1974.

3. Bradley, R. A., and B. P. Hansen, Water Resources of the Nashua and Souhegan River Basins, Massachusetts, U.S. Geological Survey Atlas AA-279.

4. Well Logs for Wells No. 1 through 6 compiled by R. E. Chapman Company, Oakdale, Massachusetts. November 1980.

5. Letter. Winston E. Fox, Town Surveyor, Holden, Massachusetts to Gilbert T. Joly, DEQE, Worcester, Massachusetts dated 19 November 1981.

6. Telecon. Hagger, Christopher, Ecology and Environment, Inc. with Alan Berg, Holden Town Engineer, 3 November 1981. Discussion of Site History and Waste Characteristics.

7. Memo. Stephen Mangion, Geologist, EPA Waste Management Branch to John Hackler, Chief EPA Office of Uncontrolled Waste Sites dated 16 April 1981. Trip report for site visit to Holden Town Landfill.

8. Memo. Stephen Mangion, Geologist EPA Waste Management Branch to John Hackler, Chief EPA Office of Uncontrolled Waste Sites dated 14 August 1981. Additional Monitoring Wells at the Holden Town Dump.

APPENDIX A

EPA

POTENTIAL HAZARDOUS WASTE SITE
IDENTIFICATION AND PRELIMINARY ASSESSME

REGION | SITE NUMBER (to be assigned by HQ)

NOTE: This form is completed for each potential hazardous waste site to help set priorities for site inspection. The information submitted on this form is based on available records and may be updated on subsequent forms as a result of additional inquiries and on-site inspections.

GENERAL INSTRUCTIONS: Complete Sections I and III through X as completely as possible before Section II (*Preliminary Assessment*). File this form in the Regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (*EN-335*); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: Holden Town Dump

B. STREET (for other identifier): Harris Street

C. CITY: Holden

D. STATE: MA

E. ZIP CODE: 01520

F. COUNTY NAME: Worcester

G. OWNER/OPERATOR (If known)

1. NAME: Town of Holden

2. TELEPHONE NUMBER:

H. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☑ 4. MUNICIPAL ☐ 5. PRIVATE ☐ 6. UNKNOWN

I. SITE DESCRIPTION

Municipal Dump

J. HOW IDENTIFIED (i.e., citizen's complaints, OSHA citations, etc.)

EPA - John Hackler

K. DATE IDENTIFIED (mo., day, & yr.): 5/1/80

L. PRINCIPAL STATE CONTACT

1. NAME: Sabin Lord MAB WPC (East)

2. TELEPHONE NUMBER: 617 726-6373

II. PRELIMINARY ASSESSMENT (complete this section last)

A. APPARENT SERIOUSNESS OF PROBLEM

☑ 1. HIGH ☐ 2. MEDIUM ☐ 3. LOW ☐ 4. NONE ☐ 5. UNKNOWN

RECOMMENDATION

☐ 1. NO ACTION NEEDED (*no hazard*)

☐ 2. IMMEDIATE SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR: _____
b. WILL BE PERFORMED BY: _____

☑ 3. SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR: 2 MAY 1980
b. WILL BE PERFORMED BY: David W Tompoff

☐ 4. SITE INSPECTION NEEDED (*low priority*)

C. PREPARER INFORMATION

1. NAME: David W Tompoff

2. TELEPHONE NUMBER: 617/223-7265

3. DATE (mo., day, & yr.): 5/29/80

III. SITE INFORMATION

A. SITE STATUS

☑ 1. ACTIVE (*Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.*)

☐ 2. INACTIVE (*Those sites which no longer receive wastes.*)

☐ 3. OTHER (specify): _____ (*Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.*)

B. IS GENERATOR ON SITE?

☑ 1. NO ☐ 2. YES (specify generator's four-digit SIC Code): _____

AREA OF SITE (in acres): 15

D. IF APPARENT SERIOUSNESS OF SITE IS HIGH, SPECIFY COORDINATES

1. LATITUDE (deg.-min.-sec.): 42° 22' 70.3N

2. LONGITUDE (deg.-min.-sec.): 71° 49' 16.9"N

E. ARE THERE BUILDINGS ON THE SITE?

☐ 1. NO ☑ 2. YES (specify): Barn for Payloader

...relating to each activity by marking 'X' in the appropriate boxes.

X	A. TRANSPORTER
	1. RAIL
	2. SHIP
	3. BARGE
X	4. TRUCK
	5. PIPELINE
	6. OTHER (specify):

X	B. STORER
	1. F...
	2. SURFACE IMPOUNDMENT
X	3. DRUMS
	4. TANK, ABOVE GROUND
	5. TANK, BELOW GROUND
X	6. OTHER (specify): Loose material under dirt

X	C. TRE...
	1. FILTRATION
	2. INCINERATION
	3. VOLUME REDUCTION
	4. RECYCLING/RECOVERY
	5. CHEM./PHYS. TREATMENT
	6. BIOLOGICAL TREATMENT
	7. WASTE OIL REPROCESSING
	8. SOLVENT RECOVERY
X	9. OTHER (specify): Sanitary Landfill

X	D. DISPOSER
X	1. LANDFILL
	2. LANDFARM
	3. OPEN DUMP
	4. SURFACE IMPOUNDMENT
	5. MIDNIGHT DUMPING
	6. INCINERATION
	7. UNDERGROUND INJECTION
	8. OTHER (specify):

E. SPECIFY DETAILS OF SITE ACTIVITIES AS NEEDED

Site is a municipal landfill

V. WASTE RELATED INFORMATION

A. WASTE TYPE

[X] 1. UNKNOWN [ ] 2. LIQUID [ ] 3. SOLID [ ] 4. SLUDGE [ ] 5. GAS

B. WASTE CHARACTERISTICS

[X] 1. UNKNOWN [ ] 2. CORROSIVE [ ] 3. IGNITABLE [ ] 4. RADIOACTIVE [ ] 5. HIGHLY VOLATILE
[ ] 6. TOXIC [ ] 7. REACTIVE [ ] 8. INERT [ ] 9. FLAMMABLE

[ ] 10. OTHER (specify):

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

No

2. Estimate the amount (specify unit of measure) of waste by category; mark 'X' to indicate which wastes are present.

a. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	e. SC...DS	f. OTHER
AMOUNT: Unknown	AMOUNT: Unknown	AMOUNT: Unknown	AMOUNT: Unknown	AMOUNT: Unknown	AMOUNT: Unknown
UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE
[ ] (1) PAINT, PIGMENTS	[ ] (1) OILY WASTES	[ ] (1) HALOGENATED SOLVENTS	[ ] (1) ACIDS	[ ] (1) FLYASH	[X] (1) LABORATORY PHARMACEUT.
[ ] (2) METALS SLUDGES	[ ] (2) OTHER (specify):	[ ] (2) NON-HALOGNTD. SOLVENTS	[ ] (2) PICKLING LIQUORS	[ ] (2) ASBESTOS	[ ] (2) HOSPITAL
[ ] (3) POTW		[ ] (3) OTHER (specify):	[ ] (3) CAUSTICS	[ ] (3) MILLING/ MINE TAILINGS	[ ] (3) RADIOACTIVE
[ ] (4) ALUMINUM SLUDGE			[ ] (4) PESTICIDES	[ ] (4) FERROUS SMLTG. WASTES	[ ] (4) MUNICIPAL
[ ] (5) OTHER (specify):			[ ] (5) DYES/INKS	[ ] (5) NON-FERROUS SMLTG. WASTES	[ ] (5) OTHER (specify):
			[ ] (6) CYANIDE	[ ] (6) OTHER (specify):	
			[ ] (7) PHENOLS		
			[ ] (8) HALOGENS		
			[ ] (9) PCB		
			[ ] (10) METALS		
			[ ] (11) OTHER (specify)		

Continue On Page 3

II. WASTE RELATED INFORMATION (continued)

3. LIST SUBSTANCES OF GREATEST CONCERN WHICH MAY BE ON THE SITE (place in descending order of hazard).

Trich. methane
Trichloroethylene
Benzene
Toluene
Cresol
Ethyl Benzene

4. ADDITIONAL COMMENTS OR NARRATIVE DESCRIPTION OF SITUATION KNOWN OR REPORTED TO EXIST AT THE SITE.

Actual Discharge. Site is on DPW Property — Not The Dump

VI. HAZARD DESCRIPTION

A. TYPE OF HAZARD.	B. POTENTIAL HAZARD (mark 'X')	C. ALLEGED INCIDENT (mark 'X')	D. DATE OF INCIDENT (mo., day, yr.)	E. REMARKS
1. NO HAZARD				
2. HUMAN HEALTH	✓			
3. NON-WORKER INJURY/EXPOSURE	✓			
4. WORKER INJURY				
5. CONTAMINATION OF WATER SUPPLY	✓			
6. CONTAMINATION OF FOOD CHAIN	✓			
7. CONTAMINATION OF GROUND WATER	✓	✓	2 MAY 80	Ground water is polluting
8. CONTAMINATION OF SURFACE WATER	✓	✓	2 MAY 80	The Quinapoxet River
9. DAMAGE TO FLORA/FAUNA	✓			
10. FISH KILL	✓			
11. CONTAMINATION OF AIR	✓	✓	2 MAY 80	Smells Like A sewer
12. NOTICEABLE ODORS	✓	✓	2 MAY 80	" " " "
13. CONTAMINATION OF SOIL	✓	✓	2 MAY 80	Red deposit
14. PROPERTY DAMAGE				
15. FIRE OR EXPLOSION				
16. SPILLS/LEAKING CONTAINERS/ RUNOFF/STANDING LIQUIDS				
17. SEWER, STORM DRAIN PROBLEMS				
18. EROSION PROBLEMS				
19. INADEQUATE SECURITY				
20. INCOMPATIBLE WASTES	✓			
21. MIDNIGHT DUMPING	✓			
22. OTHER (specify):				

VII. PERMIT INFORMATION

A. INDICATE ALL APPLICABLE PERMITS HELD BY THE SITE.

☐ 1. NPDES PERMIT ☐ 2. SPCC PLA. ☐ 3. STATE PERMIT (specify): UNKNOWN
☐ 4. AIR PERMITS ☐ 5. LOCAL PERMIT ☐ 6. RCRA TRANSPORTER
☐ 7. RCRA STORER ☐ 8. RCRA TREATER ☐ 9. RCRA DISPOSER

☐ 10. OTHER (specify): _____

B. IN COMPLIANCE?

☐ 1. YES ☐ 2. NO ☑ 3. UNKNOWN

4. WITH RESPECT TO (list regulation name & number): _____

VIII. PAST REGULATORY ACTIONS

☐ A. NONE ☐ B. YES (summarize below)

unknown

IX. INSPECTION ACTIVITY (past or on-going)

☐ A. NONE ☐ B. YES (complete items 1,2,3, & 4 below)

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION (mo., day, & yr.)	3. PERFORMED BY: (EPA/State)	4. DESCRIPTION
unknown			

X. REMEDIAL ACTIVITY (past or on-going)

☐ A. NONE ☑ B. YES (complete items 1, 2, 3, & 4 below)

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION (mo., day, & yr.)	3. PERFORMED BY: (EPA/State)	4. DESCRIPTION
OU#1M Cleanup	27 MAY 1980	EPA	Filter System Installation

NOTE: Based on the information in Sections III through X, fill out the Preliminary Assessment *(Section II)* information on the first page of this form.

APPENDIX B

PRIORITY POLLUTANT ANALYTICAL RESULTS
GROUNDWATER MONITORING WELL S' ING

Location: Holden, Mass.
Sampling Date: July 1981

	MONITORING WELL REFERENCE NUMBER(S)			
VOLATILES (ug/1)	W02	W03	W04	W05
acrolein	ND	ND	ND	ND
acrylonitrile	ND	ND	ND	ND
benzene	9	9	3	1
carbon tetrachloride	ND	ND	ND	ND
chlorobenzene	ND	ND	~1	< 30
1,2-dichloroethane	ND	ND	ND	ND
1,1,1-trichloroethane	ND	ND	ND	ND
1,1-dichloroethene	ND	< 1	3	ND
1,1,2-trichloroethane	ND	ND	ND	ND
1,1,2,2-tetrachloroethene	ND	ND	ND	ND
chloroethane	ND	ND	ND	ND
2-chloroethylvinyl ether	ND	ND	ND	ND
chloroform	ND	ND	ND	ND
1,1-dichloroethylene	ND	ND	ND	ND
1,2-trans-dichloroethylene	25	6	16	ND
1,2-dichloropropane	ND	ND	ND	ND
1,3-dichloropropylene	ND	ND	ND	ND
ethylbenzene	8	13	1	30
methylene chloride	ND	ND	ND	1
methyl chloride	ND	ND	ND	ND
methyl bromide	ND	ND	ND	ND
bromoform	ND	ND	ND	ND
dichlorobromomethane	ND	ND	ND	ND
trichlorofluoromethane	ND	ND	ND	ND
dichlorodifluoromethane	ND	ND	ND	ND
chlorodibromomethane	ND	ND	ND	ND
tetrachloroethylene	ND	ND	ND	ND
toluene	67	62	2	60
trichloroethylene	ND	ND	ND	ND
vinyl chloride	100	18	34	58
OTHER:(ug/1)				
xylenes	50	26	3	110
dichlorofluoromethane	ND	ND	PRESENT	ND
acetone	ND	ND	ND	ND
isopropanol	ND	ND	ND	ND
methyl ethyl ketone	ND	ND	ND	ND
butanol	ND	ND	ND	ND
C-7 alkane	ND	ND	ND	ND
methyl isobutyl ketone	ND	ND	ND	7
hexanol	ND	ND	ND	ND
C-3 benzene	ND	ND	ND	ND
C-9 alkane	ND	ND	ND	ND
trichlorotrifluoroethane	ND	ND	ND	ND
dichlorotrifluoroethane	ND	ND	ND	ND
C-6 alkane	ND	ND	ND	ND
hexanol	ND	ND	ND	ND
C-8 ketone	ND	ND	ND	ND
aldehyde	ND	ND	ND	ND
tetrahydrofuran	ND	ND	ND	ND
glycol type molecule	PRESENT	PRESENT	ND	ND
camphor	PRESENT	PRESENT	ND	ND
C-10 alkane	PRESENT	PRESENT	ND	PRESENT
chlorofluoromethane	ND	PRESENT	ND	ND
ethyl ether	ND	PRESENT	ND	ND
C-3 alkyl benzene	ND	PRESENT	PRESENT	PRESENT
methyl ethyl sulfide	ND	ND	ND	PRESENT
dioxane	ND	ND	ND	138
methyl isopropyl ketone	ND	ND	ND	PRESENT
dimethyl furan	ND	ND	ND	PRESENT
hexanone	ND	ND	ND	PRESENT
heptanone	ND	ND	ND	PRESENT
large alkanes, LC-10	ND	ND	ND	PRESENT

ND - Not Detected

PRIORITY POLLUTANT ANALYTICAL ILTS
GROUNDWATER MONITORING WELL SA..._ING

Location: Holden, Mass
Sampling Date: July 1981

	MONITORING WELL REFERENCE NUMBER(S)			
VOLATILES (ug/l)	W06	L1A	L1B	L1C
acrolein	ND	ND	ND	ND
acrylonitrile	ND	ND	ND	ND
benzene	6	ND	ND	ND
carbon tetrachloride	ND	ND	ND	ND
chlorobenzene	<7	ND	ND	ND
1,2-dichloroethane	ND	ND	ND	ND
1,1,1-trichloroethane	1	65	55	ND
1,1-dichloroethane	4	59	27	ND
1,1,2-trichloroethane	ND	ND	ND	ND
1,1,2,2-tetrachloroethene	ND	ND	ND	ND
chloroethane	ND	ND	ND	ND
2-chloroethylvinyl ether	ND	ND	ND	ND
chloroform	ND	ND	ND	ND
1,1-dichloroethylene	ND	ND	ND	ND
1,2-trans-dichloroethylene	92	16	9	ND
1,2-dichloropropane	ND	ND	ND	ND
1,3-dichloropropylene	ND	ND	ND	ND
ethylbenzene	7	3	ND	ND
methylene chloride	ND	ND	ND	ND
methyl chloride	ND	ND	ND	ND
methyl bromide	ND	ND	ND	ND
bromoform	ND	ND	ND	ND
dichlorobromomethane	ND	ND	ND	ND
trichlorofluoromethane	ND	ND	ND	ND
dichlorodifluoromethane	ND	ND	ND	ND
chlorodibromomethane	ND	ND	ND	ND
tetrachloroethylene	ND	ND	ND	ND
toluene	12	11	5	ND
trichloroethylene	ND	ND	ND	ND
vinyl chloride	21	ND	ND	ND
OTHER:(ug/l)				
xylenes	17	8	ND	ND
dichlorofluoromethane	PRESENT	ND	ND	ND
acetone	ND	ND	ND	PRESENT
isopropanol	ND	ND	ND	ND
methyl ethyl ketone	ND	PRESENT	PRESENT	PRESENT
butanol	ND	ND	ND	ND
C-7 alkane	ND	ND	ND	ND
methyl isobutyl ketone	ND	PRESENT	PRESENT	5
hexanol	ND	ND	ND	ND
C-3 benzene	ND	ND	ND	ND
C-9 alkane	ND	ND	ND	ND
trichlorotrifluoroethane	ND	ND	ND	ND
dichlorotrifluoroethane	ND	ND	ND	ND
C-6 alkane	ND	ND	ND	ND
hexanol	ND	ND	ND	ND
C-8 ketone	ND	ND	ND	ND
aldehyde	ND	ND	ND	ND
tetrahydrofuran	ND	ND	ND	ND
chlorofluoromethane	PRESENT	ND	ND	ND
ethyl ether	PRESENT	ND	ND	ND
glycol type molecule	PRESENT	ND	ND	ND
C-3 alkyl benzene	PRESENT	ND	ND	ND
C-10 alkane	PRESENT	ND	ND	ND
camphor	ND	ND	ND	PRESENT

ND = Not Detected

PRIORITY POLLUTANT ANALYTICAL RESULTS
GROUNDWATER MONITORING WELL SAMPLING

Location: Holden, Mass
Sampling Date: July 1981

	MONITORING WELL REFERENCE NUMBER(S)			
VOLATILES (ug/l)	L02	L03	L04	L005
acrolein	ND	ND	ND	ND
acrylonitrile	ND	ND	ND	ND
benzene	ND	ND	ND	ND
carbon tetrachloride	ND	ND	ND	ND
chlorobenzene	ND	ND	ND	ND
1,2-dichloroethane	ND	ND	ND	ND
1,1,1-trichloroethane	ND	ND	ND	ND
1,1-dichloroethene	ND	ND	ND	ND
1,1,2-trichloroethane	ND	ND	ND	ND
1,1,2,2-tetrachloroethane	ND	ND	ND	ND
chloroethane	ND	ND	ND	ND
2-chloroethylvinyl ether	ND	ND	ND	ND
chloroform	ND	ND	ND	ND
1,1-dichloroethylene	ND	ND	ND	ND
1,2-trans-dichloroethylene	ND	ND	ND	ND
1,2-dichloropropane	ND	ND	ND	ND
1,3-dichloropropylene	ND	ND	ND	ND
ethylbenzene	ND	ND	ND	ND
methylene chloride	ND	ND	ND	ND
methyl chloride	ND	ND	ND	ND
methyl bromide	ND	ND	ND	ND
bromoform	ND	ND	ND	ND
dichlorobromomethane	ND	ND	ND	ND
trichlorofluoromethane	ND	ND	ND	ND
dichlorodifluoromethane	ND	ND	ND	ND
chlorodibromomethane	ND	ND	ND	ND
tetrachloroethylene	ND	ND	ND	ND
toluene	ND	ND	ND	ND
trichloroethylene	ND	ND	ND	ND
vinyl chloride	ND	ND	ND	ND
OTHER:(ug/l)				
xylenes	ND	ND	ND	ND
dichlorofluoromethane	ND	ND	ND	ND
acetone	ND	ND	ND	ND
isopropanol	ND	ND	ND	ND
methyl ethyl ketone	ND	ND	ND	ND
butanol	ND	ND	ND	ND
C-7 alkane	ND	ND	ND	ND
methyl isobutyl ketone	ND	ND	ND	ND
hexanol	ND	ND	ND	ND
C-3 benzene	ND	ND	ND	ND
C-9 alkane	ND	ND	ND	ND
trichlorotrifluoroethane	ND	ND	ND	ND
dichlorotrifluoroethane	ND	ND	ND	ND
C-6 alkane	ND	ND	ND	ND
hexanol	ND	ND	ND	ND
C-8 ketone	ND	ND	ND	ND
aldehyde	ND	ND	ND	ND
tetrahydrofuran	ND	ND	ND	ND
dioxane	ND	ND	ABO	ND
pentanol	ND	ND	PRESENT	ND

ND = Not Detected

PRIORITY POLLUTANT ANALYTICAL RESULTS
GROUNDWATER MONITORING WELL SAMPLING

Location: Holden, Mass
Sampling Date July, 1981

	MONITORING WELL REFERENCE NUMBER(S)			
VOLATILES (ug/l)	Dump Well	001	002	
acrolein	ND	ND	ND	
acrylonitrile	ND	ND	ND	
benzene	ND	ND	ND	
carbon tetrachloride	ND	ND	ND	
chlorobenzene	ND	ND	ND	
1,2-dichloroethane	ND	ND	ND	
1,1,1-trichloroethane	ND	ND	ND	
1,1-dichloroethane	ND	ND	ND	
1,1,2-trichloroethane	ND	ND	ND	
1,1,2,2-tetrachloroethane	ND	ND	ND	
chloroethane	ND	ND	ND	
2-chloroethylvinyl ether	ND	ND	ND	
chloroform	ND	ND	ND	
1,1-dichloroethylene	ND	ND	ND	
1,2-trans-dichloroethylene	ND	ND	ND	
1,2-dichloropropane	ND	ND	ND	
1,3-dichloropropylene	ND	ND	ND	
ethylbenzene	ND	ND	ND	
methylene chloride	ND	ND	ND	
methyl chloride	ND	ND	ND	
methyl bromide	ND	ND	ND	
bromoform	ND	ND	ND	
dichlorobromomethane	ND	ND	ND	
trichlorofluoromethane	ND	ND	ND	
dichlorodifluoromethane	ND	ND	ND	
chlorodibromomethane	ND	ND	ND	
tetrachloroethylene	ND	ND	ND	
toluene	ND	ND	ND	
trichloroethylene	ND	ND	ND	
vinyl chloride	ND	ND	ND	
OTHER:(ug/l)				
xylenes	ND	ND	ND	
dichlorofluoromethane	ND	ND	ND	
acetone	ND	ND	ND	
isopropanol	ND	ND	ND	
methyl ethyl ketone	ND	ND	ND	
butanol	ND	ND	ND	
C-7 alkane	ND	ND	ND	
methyl isobutyl ketone	ND	ND	ND	
hexanol	ND	ND	ND	
C-3 benzene	ND	ND	ND	
C-9 alkane	ND	ND	ND	
trichlorotrifluoroethane	ND	ND	ND	
dichlorotrifluoroethane	ND	ND	ND	
C-6 alkane	ND	ND	ND	
hexanol	ND	ND	ND	
C-8 ketone	ND	ND	ND	
aldehyde	ND	ND	ND	
tetrahydrofuran	ND	ND	ND	

ND = Not Detected

EPA POTENTIAL HAZARDOUS WASTE SITE IDENTIFICATION AND PRELIMINARY ASSESSMENT

REGION | SITE NUMBER (To be assigned by HQ)

NOTE: This form is completed for each potential hazardous waste site to help set priorities for site inspection. The information submitted on this form is based on available records and may be updated on subsequent forms as a result of additional inquiries and on-site inspections.

GENERAL INSTRUCTIONS: Complete Sections I and III through X as completely as possible before Section II *(Preliminary Assessment)*. File this form in the Regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force *(EN-335)*; 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: Holden Town Dump

B. STREET *(or other identifier)*: Harris Street

C. CITY: Holden

D. STATE: MASS

E. ZIP CODE: 01520

F. COUNTY NAME: Worcester

G. OWNER/OPERATOR *(If known)*

1. NAME: Town of Holden

2. TELEPHONE NUMBER:

H. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☑ 4. MUNICIPAL ☐ 5 PRIVATE ☐ 6 UNKNOWN

I. SITE DESCRIPTION

Municipal Dump

J. HOW IDENTIFIED *(I.e., citizen's complaints, OSHA citations, etc.)*

EPA - John Hackler

K. DATE IDENTIFIED *(mo., day, & yr.)*: 5/1/80

L. PRINCIPAL STATE CONTACT

1. NAME: Sabin Lord MADWPC (East)

2. TELEPHONE NUMBER: 617 726-6373

II. PRELIMINARY ASSESSMENT *(complete this section last)*

A. APPARENT SERIOUSNESS OF PROBLEM

☑ 1. HIGH ☐ 2. MEDIUM ☐ 3. LOW ☐ 4 NONE ☐ 5 UNKNOWN

RECOMMENDATION

☐ 1. NO ACTION NEEDED *(no hazard)*

☐ 2. IMMEDIATE SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR:
b. WILL BE PERFORMED BY:

☑ 3. SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR: 2 MAY 1980
b. WILL BE PERFORMED BY: David W Tompoff

☐ 4. SITE INSPECTION NEEDED *(low priority)*

C. PREPARER INFORMATION

1. NAME: David W Tompoff

2. TELEPHONE NUMBER: 617/223-7265

3. DATE *(mo., day, & yr.)*: 5/25/80

III. SITE INFORMATION

A. SITE STATUS

☑ 1. ACTIVE *(Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)*

☐ 2. INACTIVE *(Those sites which no longer receive wastes.)*

☐ 3. OTHER *(specify)*: *(Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)*

B. IS GENERATOR ON SITE?

☑ 1. NO ☐ 2. YES *(specify generator's four-digit SIC Code)*:

C. AREA OF SITE *(In acres)*: 15

D. IF APPARENT SERIOUSNESS OF SITE IS HIGH, SPECIFY COORDINATES

1. LATITUDE *(deg.-min.-sec.)*: 42° 22' 40.3" N

2. LONGITUDE *(deg.-min.-sec.)*: 71° 49' 16.9" W

E. ARE THERE BUILDINGS ON THE SITE?

☐ 1. NO ☑ 2. YES *(specify)*: Barn for Payloader

T2070-2 (10-79)

Continue On Reverse

Continued From Page 2

V. WASTE RELATED INFORMATION (continu..

3. LIST SUBSTANCES OF GREATEST CONCERN WHICH MAY BE ON THE SITE (place in descending order of hazard).

Trichloroethane
Trichloroethylene
Benzene
Toluene
Cresol Ethyl Benzene

4. ADDITIONAL COMMENTS OR NARRATIVE DESCRIPTION OF SITUATION KNOWN OR REPORTED TO EXIST AT THE SITE.

Actual Discharge site is on
OPW Property — Not the Dump

VI. HAZARD DESCRIPTION

A. TYPE OF HAZARD	B. POTENTIAL HAZARD (mark 'X')	C. ALLEGED INCIDENT (mark 'X')	D. DATE OF INCIDENT (mo., day, yr.)	E. REMARKS
1. NO HAZARD				
2. HUMAN HEALTH	✓			
3. NON-WORKER INJURY/EXPOSURE	✓			
4. WORKER INJURY				
5. CONTAMINATION OF WATER SUPPLY	✓			
6. CONTAMINATION OF FOOD CHAIN	✓			
7. CONTAMINATION OF GROUND WATER	✓	✓	2 MAY 80	Ground water is polluting
8. CONTAMINATION OF SURFACE WATER	✓	✓	2 MAY 80	The Quinapoxet River
9. DAMAGE TO FLORA/FAUNA	✓			
10. FISH KILL	✓			
11. CONTAMINATION OF AIR	✓	✓	2 MAY 80	Smells like a sewer
12. NOTICEABLE ODORS	✓	✓	2 MAY 80	" " " "
13. CONTAMINATION OF SOIL	✓	✓	2 MAY 80	Red deposit
14. PROPERTY DAMAGE				
15. FIRE OR EXPLOSION				
16. SPILLS/LEAKING CONTAINERS/ RUNOFF/STANDING LIQUIDS				
17. SEWER, STORM DRAIN PROBLEMS				
18. EROSION PROBLEMS				
19. INADEQUATE SECURITY				
20. INCOMPATIBLE WASTES	✓			
21. MIDNIGHT DUMPING	✓			
22. OTHER (specify):				

 Continue On Reverse

Holden file

F1-8207-03

10-18-82

HOLDEN LANDFILL RAMP OUTLINE

EXECUTIVE SUMMARY

- Introduction
- Statement of Problem
- Purpose of Remedial Action Master Plan
- General Approach
- Initial Remedial Measures
- Remedial Investigation
- Source Control Remedial Actions
- Off-site Remedial Actions
- Schedule and Cost of Remedial Planning Activities

1.0 DATA COMPILATION AND EVALUATION

- 1.1 Objective
- 1.2 Behavior of Contaminants in the Environment
- 1.3 Background
  - A. Site Location
  - B. Environmental Setting
  - C. Site History
  - D. Previous Investigations
- 1.4 Data Requirements

2.0 REMEDIAL PLANNING ACTIVITIES

- 2.1 Introduction
  - A. General Description of Remedial Planning Activities
  - B. Development of a Comprehensive List of Remedial Action Alternatives
- 2.2 Community Relations Plan
- 2.3 Initial Remedial Measures
  - A. Site-specific objectives
  - B. Identification and evaluation of initial remedial measures
    - a. Sampling/analysis of private wells on Malden Street in Holden and town wells in West Boylston
    - b. Installation of fence and warning signs at locations of contaminated surface water drainage (Red Brook)
  - C. Implementation of Initial Remedial Measures

Holden Landfill Ramp Outline - continued

2.4 Source Control Remedial Actions

A. Site-specific Objectives

B. Identification of Data Requirements

C. Preliminary evaluation and initial screening of source control remedial actions

a. No action

b. Interception/treatment of contaminated groundwater

c. In-situ encapsulation of contaminant source(s)

d. Removal of contaminant source(s) followed by secure disposal

e. Combinations of the above actions

D. Detailed Feasibility Study of Remaining Source Control Remedial Actions and Selection of Appropriate Action(s)

E. Design/Implementation of Selected Source Control Remedial Action(s)

F. Long-term On-site Monitoring

2.5 Off-Site Remedial Actions

A. Specific Objectives

B. Identification of Data Requirements

C. Preliminary Evaluation and Initial Screening of Off-site Remedial Actions

a. No Action

b. Interception/treatment of contaminated groundwater

c. Interception/treatment of contaminated surface water drainage

d. Removal of contaminated soil followed by secure disposal

e. Operational modifications to Wachusett Reservoir system

f. Combinations of the above actions

D. Detailed Feasibility Study of Remaining Off-site Remedial Action(s)

E. Design/Implementation of Selected Off-site Remedial Actions(s)

ROUTING AND TRANSMITTAL SLIP

Date 4/7/82

TO: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1. Steve Mangion		
2.		
3.		
4.		
5.		

Action	File	Note and Return
Approval	For Clearance	Per Conversation
As Requested	For Correction	Prepare Reply
Circulate	For Your Information	See Me
Comment	Investigate	Signature
Coordination	Justify	

REMARKS

Holden Landfill

inorganic

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post)	Room No.—Bldg.
Chuck Larson	Phone No. 3-4630

5041-102

OPTIONAL FORM 41 (Rev. 7-76)
Prescribed by GSA
FPMR (41 CFR) 101-11.206

Holden Landfill Ramp Outline - continued

3.0 REMEDIAL INVESTIGATION WORK PLAN

- 3.1 Introduction
- 3.2 Safety and Health Plan
- 3.3 Sampling Protocol/Quality Control Plan
- 3.4 Sampling/Analysis of Surface Water
- 3.5 Determine Contaminant Dilution Rates and Water Quality in the Quinapoxet River and Wachusett Reservoir
- 3.6 Perform Risk Analysis of Withdrawals from Wachusett Reservoir
- 3.7 Interpret Data Obtained During Previous Geophysical Studies
- 3.8 Installation/Sampling/analysis of Groundwater Monitoring Wells
- 3.9 Conduct Aquifer Pump Test(s) and Treatability Studies

4.0 SCHEDULE AND COST ESTIMATES OF REMEDIAL PLANNING ACTIVITIES

- 4.1 Community Relations Plan
- 4.2 Initial Remedial Measures
- 4.3 Remedial Investigation
- 4.4 Feasibility Studies - Source Control and Off-site Remedial Actions
- 4.5 Design of Selected Remedial Action(s)
- 4.6 Implementation of Selected Remedial Action(s)
- 4.7 Long-term On-site Monitoring

EPA-6 (CIN)
(REV 4-80)

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
DRINKING WATER RESEARCH DIVISION

LABORATORY REPORT OF DRINKING WATER EXAMINATION

CHEMICAL ANALYSIS

St Boylston, Mass.
Boston-Wachusett watershed
other
Patapoxet River - just above I-190 Bridge + 1/2 mile below all leachate streams ~100' downstream
Raw
S - Special Reg I

Q.D. in Patapoxet R ~100' below I downstream of where leachate enters Q.R.

SERIAL NO. OF WATER SAMPLE: 54465 (1–6)

DATE OF SAMPLING — DATE COMPOSITE STARTED: MO. DAY: ____ — ENDING DATE OF COMPOSITE OR DATE OF GRAB SAMPLE: MO. DAY YR.: 11 03 81 (7–8)

TURBIDITY (l t.u.)*	58 (9–12)	CALCIUM	____ (27–31)
COLOR (15c.u.)**	35 (13)	MAGNESIUM	____ (33–37)
TOTAL DISSOLVED SOLIDS (500)**	70 (16–20)	HARDNESS as $CaCO_3$	____ (11–14)
CHLORIDE (250)**	18 (21–24)	ALKALINITY as $CaCO_3$	____ (17–20)
SULFATE (250)**	< 15 (25–28)	SPECIFIC CONDUCTANCE (MICROMOHS AT 25 C)	98 (9–12)
NITRATE -N (10.)*	< 3 (29–31)	pH (6.5-8.5)**	7.1 (14–16)
SODIUM	8.2 (32–35)	CHROMIUM (TOTAL) (FURNACE) (.05) *	< .005 (17–21)
LITHIUM	____ (36–39)	SILVER (0.05)*	< .03 (23–27)
BARIUM (1.)*	< 2 (40–44)	COPPER (1.0)**	< .02 (28–32)
ARSENIC (0.05)*(FURNACE)	< .005 (51–54)	MANGANESE (0.05) ** (SPECT.)	.06 (34–38)
SELENIUM (0.01)* (FURNACE)	< .005 (56–59)	LEAD (0.05)* (FURNACE)	< .005 (40–44)
FLUORIDE (1.4 to 2.4)*	1 (66–68)	IRON (0.3)** (SPECT.)	.27 (46–50)
SILICON	____ (22–25)	CADMIUM (0.010)* (FURNACE)	.002 (58–62)
ALUMINUM	____ (51–55)	ZINC (5)**	< .02 (64–68)
____	____ (56–61)	MERCURY (0.002)*	< .0005 (75–79)
____	____ (62–67)		

*REMARKS:

*Primary MCL **Secondary MCL

LAB. NO. 4859

Date Completed ~~4-2-82~~ 5-10-82

All values are milligrams per liter unless otherwise noted.

EPA 6 (CIN) (REV. 4-80)

J. Boylston, Mass. Boston - Wachusett Res. alter

on Landfill - main Leachate Stream at Quinapoxet River

Raw

- Special - Reg I

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
DRINKING WATER RESEARCH DIVISION
LABORATORY REPORT OF DRINKING WATER EXAMINATION
CHEMICAL ANALYSIS

Red Brook at outlet w/ Q.R.

SERIAL NO. OF WATER SAMPLE: 5 4 4 6 7 (1–6)

DATE OF SAMPLING — DATE COMPOSITE STARTED MO. DAY: — ENDING DATE OF COMPOSITE OR DATE OF GRAB SAMPLE MO. DAY YR.: 1 1 0 3 8 1 (7–8)

TURBIDITY (1 t.u.)*	6 5 (9–12)	CALCIUM	(27–31)
COLOR (15c.u.)**	1 4 (13)	MAGNESIUM	(33–37)
TOTAL DISSOLVED SOLIDS (500)**	5 6 4 (16–20)	HARDNESS as $CaCO_3$	(11–14)
CHLORIDE (250)**	2 5 (21–24)	ALKALINITY as $CaCO_3$	(17–20)
SULFATE (250)**	< 1 5 (25–28)	SPECIFIC CONDUCTANCE (MICROMOHS AT 25 C)	6 3 9 (9–12)
NITRATE -N (10.)*	< 3 (29–31)	pH (6.5-8.5)**	8 3 (14–16)
SODIUM	5 0 0 (32–35)	CHROMIUM (TOTAL) (FURNACE) (.05) *	< 0 0 5 (17–21)
LITHIUM	(36–39)	SILVER (0.05)*	< 0 3 (23–27)
BARIUM (1.)*	< 2 (40–44)	COPPER (1.0)**	< 0 2 (28–32)
ARSENIC (0.05)*(FURNACE)	< 0 0 5 (51–54)	MANGANESE (0.05) ** (SPECT.)	4 6 3 (34–38)
SELENIUM (0.01)* (FURNACE)	< 0 0 5 (56–59)	LEAD (0.05)* (FURNACE)	< 0 0 5 (40–44)
FLUORIDE (1.4 to 2.4)*	2 (56–60)	IRON (0.3)** (SPECT.)	2 4 7 (46–50)
SILICON	(22–25)	CADMIUM (0.010)* (FURNACE)	< 0 0 2 (58–62)
ALUMINUM	(51–55)	ZINC (5)**	< 0 2 (64–68)
_____	(56–61)	MERCURY (0.002)*	< 0 0 0 5 (75–79)
_____	(62–67)		

*REMARKS:

*Primary MCL **Secondary MCL

LAB. NO. 4860

All values are milligrams per liter unless otherwise noted.

Date Completed 3-10-82

U.S. ENVIRONMENTAL PROTECTION AGENCY
RESEARCH AND DEVELOPMENT
WATER RESEARCH DIVISION

LABORATORY REPORT OF DRINKING WATER EXAMINATION

CHEMICAL ANALYSIS

Golden Land Drill well site near bottom under old power line

Red Brook beneath Power line

Raw

WS - Spruce - Key I

SERIAL NO. OF WATER SAMPLE: 4462 (1–6)

DATE OF SAMPLING — DATE COMPOSITE STARTED (MO. DAY): — ENDING DATE OF COMPOSITE OR DATE OF GRAB SAMPLE (MO. DAY YR.): 11 03 81 (7–8)

TURBIDITY (1 t.u.)*	330 (9–12)	CALCIUM	(27–31)
COLOR (15c.u.)**	12 (13)	MAGNESIUM	(33–37)
TOTAL DISSOLVED SOLIDS (500)**	511 (16–20)	HARDNESS as $CaCO_3$	(11–14)
CHLORIDE (250)**	100 (21–24)	ALKALINITY as $CaCO_3$	(17–20)
SULFATE (250)**	< 15 (25–28)	SPECIFIC CONDUCTANCE (MICROMOHS AT 25 C)	982 (9–12)
NITRATE -N (10.)*	< 3 (29–31)	pH (6.5-8.5)**	81 (14–16)
SODIUM	94 0 (32–35)	CHROMIUM (TOTAL) (FURNACE) (.05) *	< .005 (17–21)
LITHIUM	(36–39)	SILVER (0.05)*	< .03 (23–27)
BARIUM (1.)*	< 2 (40–44)	COPPER (1.0)**	< .02 (28–32)
ARSENIC (0.05)*(FURNACE)	< .005 (51–54)	MANGANESE (0.05) ** (SPECT.)	.7 .10 (34–38)
SELENIUM (0.01)* (FURNACE)	< .005 (56–59)	LEAD (0.05)* (FURNACE)	< .005 (40–44)
FLUORIDE (1.4 to 2.4)*	2 (66–68)	IRON (0.3)** (SPECT.)	22.9 (46–50)
SILICON	(22–25)	CADMIUM (0.010)* (FURNACE)	.002 (58–62)
ALUMINUM	(51–55)	ZINC (5)**	< .02 (64–68)
_____	(56–61)	MERCURY (0.002)*	< .0005 (75–79)
_____	(62–67)	REMARKS:	

*Primary MCL **Secondary MCL

All values are milligrams per liter unless otherwise noted.

LAB. NO. 1261

Date Completed 3-10-82

EPA-6 (CIN)
(REV. 4-80)

Holden, Mass.
Holden Town Dump
other well HTDW02 - State of Mass. Monitoring Well - No. 75' to Water Table

Raw
Specific - Reg I

U.S. E[illegible] ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
DRINKING WATER MICROBIOLOGY DIVISION

LABORATORY REPORT OF DRINKING WATER CONTAMINATION

CHEMICAL ANALYSIS

HTD W02

SERIAL NO. OF WATER SAMPLE: 54469 (1–6)

DATE OF SAMPLING — DATE COMPOSITE STARTED MO. DAY: — ENDING DATE OF COMPOSITE OR DATE OF GRAB SAMPLE MO. DAY YR.: 11 03 81 (7–8)

TURBIDITY (1 t.u.)*	340 (9–12)	CALCIUM	(27–31)
COLOR (15c.u.)**	25 (13)	MAGNESIUM	(33–37)
TOTAL DISSOLVED SOLIDS (500)**	573 (16–20)	HARDNESS as $CaCO_3$	(11–14)
CHLORIDE (250)**	100 (21–24)	ALKALINITY as $CaCO_3$	(17–20)
SULFATE (250)**	< 15 (25–28)	SPECIFIC CONDUCTANCE (MICROMOHS AT 25 C)	1160 (9–12)
NITRATE -N (10.)*	< 3 (29–31)	pH (6.5-8.5)**	8.3 (14–16)
SODIUM	112 (32–35)	CHROMIUM (TOTAL) (FURNACE) (.05) *	.008 (17–21)
LITHIUM	(36–39)	SILVER (0.05)*	< .03 (23–27)
BARIUM (1.)*	.32 (40–44)	COPPER (1.0)**	.09 (28–32)
ARSENIC (0.05)*(FURNACE)	< .005 (51–54)	MANGANESE (0.05) ** (SPECT.)	1.84 (34–38)
SELENIUM (0.01)* (FURNACE)	< .005 (56–59)	LEAD (0.05)* (FURNACE)	.012 (40–44)
FLUORIDE (1.4 to 2.4)*	.2 (66–68)	IRON (0.3)** (SPECT.)	12 .5 (46–50)
SILICON	(22–25)	CADMIUM (0.010)* (FURNACE)	.003 (58–62)
ALUMINUM	(51–55)	ZINC (5)**	2.30 (64–68)
_____	(56–61)	MERCURY (0.002)*	< .0005 (75–79)
_____	(62–67)	REMARKS:	

*Primary MCL **Secondary MCL

LAB. NO. 4862

All values are milligrams per liter unless otherwise noted.

Date Completed ~~10-2-82~~ 3-10-82

EPA 6 (C-N)
(REV 4-77)

Holden, Mass.
" Town Dump
other

Holden Town dump - Well "HTDW05" State of Mass. Monitoring well
8' 2½" to water Table

HTD W05

Raw
Special - Reg I

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
DRINKING WATER RESEARCH DIVISION
LABORATORY REPORT OF DRINKING WATER EXAMINATION
CHEMICAL ANALYSIS

SERIAL NO. OF WATER SAMPLE: 54470 (1–6)

DATE OF SAMPLING — DATE COMPOSITE STARTED: MO. DAY: [ ][ ][ ][ ]

ENDING DATE OF COMPOSITE OR DATE OF GRAB SAMPLE: MO. DAY YR.: 11 03 81 (7–8)

TURBIDITY (1 t.u.)*	< 10 (9–12)	CALCIUM	(27–31)
COLOR (15c.u.)**	30 (13)	MAGNESIUM	(33–37)
TOTAL DISSOLVED SOLIDS (500)**	701 (16–20)	HARDNESS as $CaCO_3$	(11–14)
CHLORIDE (250)**	150 (21–24)	ALKALINITY as $CaCO_3$	(17–20)
SULFATE (250)**	< 15 (25–28)	SPECIFIC CONDUCTANCE (MICROMOHS AT 25 C)	1375 (9–12)
NITRATE -N (10.)*	< 3 (29–31)	pH (6.5-8.5)**	8.2 (14–16)
SODIUM	180 (32–35)	CHROMIUM (TOTAL) (FURNACE) (.05) *	012 (17–21)
LITHIUM	(36–39)	SILVER (0.05)*	< 03 (23–27)
BARIUM (1.)*	< 2 (40–44)	COPPER (1.0)**	06 (28–32)
ARSENIC (0.05)*(FURNACE)	< 005 (51–54)	MANGANESE (0.05) ** (SPECT.)	3 00 (34–38)
SELENIUM (0.01)* (FURNACE)	< 005 (56–59)	LEAD (0.05)* (FURNACE)	010 (40–44)
FLUORIDE (1.4 to 2.4)*	2 (66–68)	IRON (0.3)** (SPECT.)	12.2 (46–50)
SILICON	(22–25)	CADMIUM (0.010)* (FURNACE)	002 (58–62)
ALUMINUM	(51–55)	ZINC (5)**	4 42 (64–68)
_____	(56–61)	MERCURY (0.002)*	< 0005 (75–79)
_____	(62–67)	REMARKS:	

*Primary MCL **Secondary MCL

All values are milligrams per liter unless otherwise noted.

LAB. NO. 4863

Date Completed ~~10-3-82~~ 5-10-82

WA-9 (OIN)
(REV. 1-74)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF WATER PROGRAMS OPERATIONS
WATER SUPPLY DIVISION

SERIAL NO.
54463

PUNCH IN COLS.
1 6

IDENTIFICATION OF WATER SAMPLE

1. LOCATION OF WATER SUPPLY: METROPOLITAN DISTRICT COMMISSION
CITY, COUNTY, STATE: BOSTON (CLINTON, MA)

FOR OFFICE USE ONLY (7–19)

DO NOT WRITE BELOW THIS LINE

2. WATER SUPPLY NAME: MDC

3. DATE OF SAMPLING
BEGINNING DATE OF COMPOSITE (MO. DAY) (20–23):
ENDING DATE OF COMPOSITE OR DATE OF GRAB SAMPLE (MO. DAY YR.) (24–29): 1 1 0 3 8 1

4. SAMPLE FROM: ☐ TREATMENT PLANT (8) ☐ WELL (4) ☒ RESERVOIR (2) ☐ DISTRIBUTION SYSTEM (1) ☐ OTHER (0) — (30)

5. SAMPLING POINT LOCATION AND/OR DESCRIPTION: WACHUSETT RESERVOIR - ENTRANCE TO ASQUEDUCT (31–33)

6. TYPE OF WATER SAMPLED: ☐ FINISHED (8) ☐ PARTIALLY TREATED (4) ☒ RAW (2) BEFORE TURBINE ☐ OTHER (0) — (34)

7. SOURCE OF WATER: ☒ SURFACE (8) ☐ GROUND (4) ☐ COMBINED (2) ☐ OTHER (0) — (35)

8. SAMPLING METHOD: ☐ COMPOSITE (8) ☒ GRAB (4) ☐ OTHER (0) — (36)

9. ANALYSIS REQUIRED: ☒ ORGANIC (VOA) (8) ☐ TRACE ELEMENTS (4) ☐ WET (2) ☐ RADIO-CHEMICAL (1) ☐ OTHER (0) — (37)

10. WATER SUPPLY CATEGORY: ☒ COMMUNITY WATER SUPPLY (8) ☒ ICWS (4) ☐ FEDERAL INSTALLATION (2) ☒ SPECIAL STUDY (1) ☐ OTHER (0) — (38–)

11. APPEARANCE OF SAMPLE

12. ADDITIONAL REMARKS

13. COLLECTED BY: C. LARSON & D. CHIN ☒ STAFF ☐ OTHER — (80) 1

DO NOT WRITE BELOW THIS LINE

LAB. SAMPLE NO. _____ DATE RECEIVED _____

LABORATORY REMARKS

OVER FOR INSTRUCTIONS

EPA-9 (CIN)
(REV. 1-74)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF WATER PROGRAMS OPERATIONS
WATER SUPPLY DIVISION

SERIAL NO.
54454

PUNCH IN COLS.

IDENTIFICATION OF WATER SAMPLE

1 6

1. LOCATION OF WATER SUPPLY W. BOYLSTON, MA.
CITY, COUNTY, STATE

FOR OFFICE USE ONLY (7–19)

DO NOT WRITE BELO THIS LINE

2. WATER SUPPLY NAME MDC - BOSTON

3. DATE OF SAMPLING
BEGINNING DATE OF COMPOSITE MO. DAY (20–23)
ENDING DATE OF COMPOSITE OR DATE OF GRAB SAMPLE MO. DAY YR. 01 03 81 (24–29)

4. SAMPLE FROM [ ] TREATMENT PLANT 8 [ ] WELL 4 [ ] RESERVOIR 2 [ ] DISTRIBUTION SYSTEM 1 [X] OTHER 0 — 30

5. SAMPLING POINT LOCATION AND/OR DESCRIPTION QUINAPOXET RIVER AT HORSESHOE DAM — 31–32

6. TYPE OF WATER SAMPLED [ ] FINISHED 8 [ ] PARTIALLY TREATED 4 [X] RAW 2 [ ] OTHER 0 — 34

7. SOURCE OF WATER [X] SURFACE 8 [ ] GROUND 4 [ ] COMBINED 2 [ ] OTHER 0 — 35

8. SAMPLING METHOD [ ] COMPOSITE 8 [X] GRAB 4 [ ] OTHER 0 — 36

9. ANALYSIS REQUIRED [X] ORGANIC (VOA) 8 [ ] TRACE ELEMENTS 4 [ ] WET 2 [ ] RADIO-CHEMICAL 1 [ ] OTHER 0 — 37

10. WATER SUPPLY CATEGORY [X] COMMUNITY WATER SUPPLY 8 [ ] ICWS 4 [ ] FEDERAL INSTALLATION 2 [X] SPECIAL STUDY 1 [ ] OTHER 0 — 38–40

11. APPEARANCE OF SAMPLE CLEAR

12. ADDITIONAL REMARKS

13. COLLECTED BY [X] STAFF [ ] OTHER — 1 — 80

DO NOT WRITE BELOW THIS LINE

LAB. SAMPLE NO. DATE RECEIVED

LABORATORY REMARKS

OVER FOR INSTRUCTIONS

EPA-9 (CIN)
(REV. 1-74)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF WATER PROGRAMS OPERATIONS
WATER SUPPLY DIVISION

SERIAL NO. 54465

PUNCH IN COLS. 1 6

IDENTIFICATION OF WATER SAMPLE

1. LOCATION OF WATER SUPPLY: WEST BOYLSTON, MA
CITY, COUNTY, STATE

FOR OFFICE USE ONLY (7–19)

DO NOT WRITE BELOW THIS LINE

2. WATER SUPPLY NAME: MDC - BOSTON - WACHUSETT WATERSHED

3. DATE OF SAMPLING: BEGINNING DATE OF COMPOSITE MO. DAY (20–23); ENDING DATE OF COMPOSITE OR DATE OF GRAB SAMPLE MO. DAY YR. 1 1 0 3 8 1 (24–29)

4. SAMPLE FROM: [ ] TREATMENT PLANT (8) [ ] WELL (4) [ ] RESERVOIR (2) [ ] DISTRIBUTION SYSTEM (1) [X] OTHER (0) — (30)

5. SAMPLING POINT LOCATION AND/OR DESCRIPTION: JUST ABOVE QUINAPOXET RIVER AT I-190 BRIDGE SITE (31–33)

6. TYPE OF WATER SAMPLED: [ ] FINISHED (8) [ ] PARTIALLY TREATED (4) [X] RAW (2) AND JUST BELOW ALL LEACHATE STREAMS (ABOUT 100' DOWNSTREAM) [ ] OTHER (0) — (34)

7. SOURCE OF WATER: [X] SURFACE (8) [ ] GROUND (4) [ ] COMBINED (2) [ ] OTHER (0) — (35)

8. SAMPLING METHOD: [ ] COMPOSITE (8) [X] GRAB (4) [ ] OTHER (0) — (36)

9. ANALYSIS REQUIRED: [X] VOA ORGANIC (8) [ ] TRACE ELEMENTS (4) [ ] WET (2) [ ] RADIO-CHEMICAL (1) [ ] OTHER (0) — (37)

10. WATER SUPPLY CATEGORY: [✓] COMMUNITY WATER SUPPLY (8) [ ] ICWS (4) [ ] FEDERAL INSTALLATION (2) [X] SPECIAL STUDY (1) [ ] OTHER (0) — (38–40)

11. APPEARANCE OF SAMPLE: _____

12. ADDITIONAL REMARKS: _____

13. COLLECTED BY: LARSON & CHIN [X] STAFF [ ] OTHER — (80) 1

DO NOT WRITE BELOW THIS LINE

LAB. SAMPLE NO. _____ DATE RECEIVED _____

LABORATORY REMARKS

OVER FOR INSTRUCTIONS

EPA-9 (CIN)
(REV. 1-74)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF WATER PROGRAM OPERATIONS
WATER SUPPLY DIVISION

SERIAL NO.
54466

PUNCH IN COLS. 1 6

IDENTIFICATION OF WATER SAMPLE

1. LOCATION OF WATER SUPPLY W. BOYLSTON — MA.
CITY, COUNTY, STATE

FOR OFFICE USE ONLY (7)

2. WATER SUPPLY NAME MDC - BOSTON WATERSHED — WACHUSETT RESERVOIR

DO NOT WRITE BELOW THIS LINE

3. DATE OF SAMPLING
BEGINNING DATE OF COMPOSITE MO. DAY (20–23)
ENDING DATE OF COMPOSITE OR DATE OF GRAB SAMPLE MO. DAY YR. 11 03 91 (24–29)

4. SAMPLE FROM (8) ☐ TREATMENT PLANT (4) ☐ WELL (2) ☐ RESERVOIR (1) ☐ DISTRIBUTION SYSTEM (0) ☒ OTHER — (30)

5. SAMPLING POINT LOCATION AND/OR DESCRIPTION HOLDEN LANDFILL NEW LEACHATE BREAKOUT (31–33)

6. TYPE OF WATER SAMPLED (8) ☐ FINISHED (4) ☐ PARTIALLY TREATED (2) ☒ RAW — DUMP LEACHATE (0) ☐ OTHER (34)

7. SOURCE OF WATER (8) ☐ SURFACE (4) ☑ GROUND (2) ☐ COMBINED (0) ☐ OTHER (35)
COMING OUT OF GROUND BELOW LANDFILL

8. SAMPLING METHOD (8) ☐ COMPOSITE (4) ☑ GRAB (0) ☐ OTHER (36)

9. ANALYSIS REQUIRED (8) ☒ ORGANIC VOA (4) ☐ TRACE ELEMENTS (2) ☐ WET (1) ☐ RADIO-CHEMICAL (0) ☐ OTHER (37)

10. WATER SUPPLY CATEGORY (8) ☒ COMMUNITY WATER SUPPLY (4) ☐ ICWS (2) ☐ FEDERAL INSTALLATION (1) ☒ SPECIAL STUDY (0) ☐ OTHER (38–40)

11. APPEARANCE OF SAMPLE

12. ADDITIONAL REMARKS STRONG ODOR - IRON PRECIPITATE ON GROUND

13. COLLECTED BY LARSON & CHIN ☒ STAFF ☐ OTHER (80) 1

DO NOT WRITE BELOW THIS LINE

LAB. SAMPLE NO. DATE RECEIVED

LABORATORY REMARKS

OVER FOR INSTRUCTIONS

EPA-9 (CIN)
(REV. 1-74)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF WATER PROGRAMS OPERATIONS
WATER SUPPLY DIVISION

PUNCH IN COLS. 1 6

IDENTIFICATION OF WATER SAMPLE

1. LOCATION OF WATER SUPPLY W. BOYLSTON, WORCESTER, MA
CITY, COUNTY, STATE

FOR OFFICE USE ONLY (7–19)

DO NOT WRITE BELO THIS LINE

2. WATER SUPPLY NAME MDC-BOSTON - WACHUSETT RESERVOIR

3. DATE OF SAMPLING
BEGINNING DATE OF COMPOSITE MO. DAY (20–23)
ENDING DATE OF COMPOSITE OR DATE OF GRAB SAMPLE MO. DAY YR. 1/1/03/81 (24–29)

4. SAMPLE FROM [ ] TREATMENT PLANT (8) [ ] WELL (4) [ ] RESERVOIR (2) [ ] DISTRIBUTION SYSTEM (1) [X] OTHER (0) [ ] (30)

5. SAMPLING POINT LOCATION AND/OR DESCRIPTION HOLDEN LANDFILL MAIN LEACHATE STREAM AT QUINAPOXET RIVER (31–33)

6. TYPE OF WATER SAMPLED [ ] FINISHED (8) [ ] PARTIALLY TREATED (4) [✓] RAW (2) [ ] OTHER (0) [ ] (34)

7. SOURCE OF WATER [ ] SURFACE (8) [✓] GROUND (4) LEACHATE STREAM [ ] COMBINED (2) [ ] OTHER (0) [ ] (35)

8. SAMPLING METHOD [ ] COMPOSITE (8) [✓] GRAB (4) [ ] OTHER (0) [ ] (36)

9. ANALYSIS REQUIRED [✓] ORGANIC (8) VOA [ ] TRACE ELEMENTS (4) [ ] WET (2) [ ] RADIO-CHEMICAL (1) [ ] OTHER (0) [ ] (37)

10. WATER SUPPLY CATEGORY [✓] COMMUNITY WATER SUPPLY (8) [ ] ICWS (4) [ ] FEDERAL INSTALLATION (2) [✓] SPECIAL STUDY (1) [ ] OTHER (0) [ ] (38–40)

11. APPEARANCE OF SAMPLE

12. ADDITIONAL REMARKS STRONG ODOR — IRON PRECIPITATE ON ROCKS

13. COLLECTED BY LARSON & CHIN [✓] STAFF [ ] OTHER [1] (80)

DO NOT WRITE BELOW THIS LINE

LAB. SAMPLE NO. DATE RECEIVED

LABORATORY REMARKS

OVER FOR INSTRUCTIONS

EPA-S (GIB)
(REV. 1-74)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF WATER PROGRAMS OPERATIONS
WATER SUPPLY DIVISION

SERIAL NO.
54468

PUNCH IN COLS. 1 6

IDENTIFICATION OF WATER SAMPLE

1. LOCATION OF WATER SUPPLY: W. BOYLSTON (WORCESTER COUNTY) MA
CITY, COUNTY, STATE

FOR OFFICE USE ONLY (7–19)

DO NOT WRITE BELOW THIS LINE

2. WATER SUPPLY NAME: MDC - BOSTON WACHUSETT WATERSHED RESERVOIR #

3. DATE OF SAMPLING
BEGINNING DATE OF COMPOSITE (MO. DAY) (20–23):
ENDING DATE OF COMPOSITE OR DATE OF GRAB SAMPLE (MO. DAY YR.) (24–29): 1/03/81

4. SAMPLE FROM: ☐ TREATMENT PLANT (8) ☐ WELL (4) ☐ RESERVOIR (2) ☐ DISTRIBUTION SYSTEM (1) ☑ OTHER (0) (30)

5. SAMPLING POINT LOCATION AND/OR DESCRIPTION: HOLDEN LANDFILL LEACHATE NEAR BREAKOUT UNDER OLD POWER LINE (31–33)

6. TYPE OF WATER SAMPLED: ☐ FINISHED (8) ☐ PARTIALLY TREATED (4) ☑ RAW (2) ☐ OTHER (0) (34)

7. SOURCE OF WATER: ☐ SURFACE (8) ☑ GROUND (4) LANDILL (DUMP) LEACHATE ☐ COMBINED (2) ☐ OTHER (0) (35)

8. SAMPLING METHOD: ☐ COMPOSITE (8) ☑ GRAB (4) ☐ OTHER (0) (36)

9. ANALYSIS REQUIRED: ☑ ORGANIC (8) VOLATILE - PRIORITY POLLUTANTS ☐ TRACE ELEMENTS (4) ☐ WET (2) ☐ RADIO-CHEMICAL (1) ☐ OTHER (0) (37)

10. WATER SUPPLY CATEGORY: ☑ COMMUNITY WATER SUPPLY (8) ☐ ICWS (4) ☐ FEDERAL INSTALLATION (2) ☑ SPECIAL STUDY (1) ☐ OTHER (0) (38–40)

11. APPEARANCE OF SAMPLE: YELLOW - TURBID

12. ADDITIONAL REMARKS: ODOR — IRON PRECIPITATE

13. COLLECTED BY: LARSON & CHIN ☑ STAFF ☐ OTHER (80): 1

DO NOT WRITE BELOW THIS LINE

LAB. SAMPLE NO. _____ DATE RECEIVED _____

LABORATORY REMARKS

OVER FOR INSTRUCTIONS

EPA-9 (CIH)
(REV. 1-74)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF WATER PROGRAMS OPERATIONS
WATER SUPPLY DIVISION

SERIAL NO.
54469

PUNCH IN COLS. 1 6

IDENTIFICATION OF WATER SAMPLE

1. LOCATION OF WATER SUPPLY Holden Worcester MA
CITY, COUNTY, STATE

FOR OFFICE USE ONLY (7–19)

DO NOT WRITE BELOW THIS LINE

2. WATER SUPPLY NAME Holden Town Dump

3. DATE OF SAMPLING
BEGINNING DATE OF COMPOSITE MO. DAY (20–23)
ENDING DATE OF COMPOSITE OR DATE OF GRAB SAMPLE MO. DAY YR. 1 1 0 3 8 1 (24–29)

4. SAMPLE FROM ☐ TREATMENT PLANT (8) ☐ WELL (4) ☐ RESERVOIR (2) ☐ DISTRIBUTION SYSTEM (1) ☑ OTHER (0) — (30)

5. SAMPLING POINT LOCATION AND/OR DESCRIPTION 40.75' TO WATER TABLE
Well # HTOW02 - State of Mass Monitoring Well (31–32)

6. TYPE OF WATER SAMPLED ☐ FINISHED (8) ☐ PARTIALLY TREATED (4) ☑ RAW (2) ☐ OTHER (0) — (34)

7. SOURCE OF WATER ☐ SURFACE (8) ☑ GROUND (4) ☐ COMBINED (2) ☐ OTHER (0) — (35)

8. SAMPLING METHOD ☐ COMPOSITE (8) ☑ GRAB (4) ☐ OTHER (0) — (36)

9. ANALYSIS REQUIRED ☑ VOA ORGANIC (8) ☐ TRACE ELEMENTS (4) ☐ WET (2) ☐ RADIO-CHEMICAL (1) ☐ OTHER (0) — (37)

10. WATER SUPPLY CATEGORY ☐ COMMUNITY WATER SUPPLY (8) ☐ ICWS (4) ☐ FEDERAL INSTALLATION (2) ☑ SPECIAL STUDY (1) ☐ OTHER (0) — (38–40)

11. APPEARANCE OF SAMPLE

12. ADDITIONAL REMARKS

13. COLLECTED BY Larson Chin ☑ STAFF ☐ OTHER — (80) 1

DO NOT WRITE BELOW THIS LINE

LAB. SAMPLE NO. DATE RECEIVED

LABORATORY REMARKS

OVER FOR INSTRUCTIONS

EPA-9 (CIN)
(REV. 1-74)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF WATER PROGRAMS OPERATIONS
WATER SUPPLY DIVISION

SERIAL NO. 5447C

PUNCH IN COLS. 1 6

IDENTIFICATION OF WATER SAMPLE

1. LOCATION OF WATER SUPPLY: HOLDEN, WORCESTER, MASS.
CITY, COUNTY, STATE

FOR OFFICE USE ONLY (7–19)

DO NOT WRITE BELOW THIS LINE

2. WATER SUPPLY NAME: HOLDEN TOWN DUMP

3. DATE OF SAMPLING
BEGINNING DATE OF COMPOSITE — MO. — DAY (20–23)
ENDING DATE OF COMPOSITE OR DATE OF GRAB SAMPLE — MO. 1 — DAY 03 — YR. 81 (24–29)
2pm

4. SAMPLE FROM: [ ] TREATMENT PLANT (8) [ ] WELL (4) [ ] RESERVOIR (2) [ ] DISTRIBUTION SYSTEM (1) [✓] OTHER (0) (30)

5. SAMPLING POINT LOCATION AND/OR DESCRIPTION: HOLDEN TOWN DUMP WELL #HTDW05 STATE OF MASS. MONITORING WELL (31–33)

6. TYPE OF WATER SAMPLED: [ ] FINISHED (8) [ ] PARTIALLY TREATED (4) [✓] RAW (2) 8½" TO WATER TABLE [ ] OTHER (0) (34)

7. SOURCE OF WATER: [ ] SURFACE (8) [✓] GROUND (4) [ ] COMBINED (2) [ ] OTHER (0) (35)

8. SAMPLING METHOD: [ ] COMPOSITE (8) [✓] GRAB (4) [ ] OTHER (0) (36)

9. ANALYSIS REQUIRED: [✓] ORGANIC (VOA) (8) [ ] TRACE ELEMENTS (4) [ ] WET (2) [ ] RADIO-CHEMICAL (1) [ ] OTHER (0) (37)

10. WATER SUPPLY CATEGORY: [ ] COMMUNITY WATER SUPPLY (8) [ ] ICWS (4) [ ] FEDERAL INSTALLATION (2) [X] SPECIAL STUDY (1) [ ] OTHER (0) (38–40)

11. APPEARANCE OF SAMPLE: _____

12. ADDITIONAL REMARKS: VERY STRONG ODOR "GARLIC"

13. COLLECTED BY: LARSON & CHIN [X] STAFF [ ] OTHER (60) [1]

DO NOT WRITE BELOW THIS LINE

LAB. SAMPLE NO. _____ DATE RECEIVED _____

LABORATORY REMARKS

OVER FOR INSTRUCTIONS